TOWILL | Surveying, Mapping and GIS Services

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January 6, 2004

City of Milpitas
1265 North Milpitas Blvd.
Milpitas, CA 95035
Att: Alan Rich

Subject: **Color Orthophoto Update Project**
City of Milpitas
Towill File No. 10275-901

Dear Mr. Rich,

Please find attached Towill's proposal for the subject project. The scope of work has been updated to include annual updates to the orthophoto base mapping for a period of three years.

Thank you for requesting this proposal from Towill, Inc. If for any reason this proposal does not meet your budget or time constraints, please contact me to discuss options to revise the proposal to meet your needs.

Very truly yours,

TOWILL, INC.

Brian K. Young

Brian K. Young
Regional Director

C:\jobs\Proposals\10275-901-011 Milpitas\docs\CoverLetter.doc

SCOPE OF WORK

Orthophoto Update Project
City of Milpitas

January 6, 2004

1.1 Project Design & Planning

The proposed technical approach incorporates all useful data produced as part of the 1999 orthophoto project while taking advantage of recent advances in photogrammetric mapping equipment and procedures. Most significant is Towill's ability to perform the current project using existing survey control and utilizing much of the 1999 digital terrain data. The benefit to the City of Milpitas is reducing project costs and compressing the schedule while maintaining the quality of the deliverable products.

The proposed design will produce 1"-100' scale color (24-bit) digital orthophotos with a pixel (ground) resolution of 0.25'.

1.2 Aerial Photography

New color aerial photography will be flown at an altitude of 3600' above mean terrain. This flight altitude will result in a 1"-600' film scale. The orthophoto update project will utilize the same flight plan as the 1999 project.

The aircraft used to acquire the aerial photography is equipped with GPS navigation and positioning equipment. The flight crew will be provided with the latitude/longitude for each photo center. They will use this data for aligning flight lines and determining camera exposures.

1.3 Survey Ground Control

A number of survey ground control points established as part of the 1999 project will be recovered and paneled prior to the aerial photo mission. These points will be visible in the new aerial photography and will provide the necessary photo control.

1.4 Digital Orthophoto Production

The orthophoto production process is initiated by scanning the aerial film negatives. Scanning resolution will be set at 11.5 microns (approximately 2200 dots-per-inch). Scanned images within each flight line will be tied together through aerotriangulation.

Schedule

We anticipate the first set of aerial photography will be flown in February or March 2004. Orthophoto production for tiles encompassing the entire study area will require three to four months to complete. The spring 2004 orthophotography will be delivered by June 30, 2004 at the present workload.

The schedule for the 2004, 2005, & 2006 orthophoto tile maintenance will be directed by the City of Milpitas. In general, aerial photography for each annual update will be flown within two weeks from Notice-To-Proceed (NTP) and final deliverables will be completed in eight to ten weeks.

Digital terrain models (DTM) of the ground surface are required for the orthorectification process. The DTMs created by Towill in 1999 will be superimposed onto the 2004 aerial imagery and updated where significant changes in elevation have occurred. Softcopy technicians will also determine the placement of seamlines between adjacent photos at this stage.

Orthophoto tile boundaries will be developed using a 1000'x1000' tiling system as shown in Exhibit A. The new tile boundaries will form a seamless and non-overlapping set of orthophoto images.

New orthophoto images will be produced from the 2004 aerial photography once the DTM files are updated. As part of the quality assurance process, each new orthophoto image will be reviewed for edge-match, color balance and contrast, map accuracy and overall image quality. Image blemishes such as isolated scratches in film negatives will be repaired using image-editing software.

1.5 Deliverable Preparation

The following deliverable items will be prepared:

1. One set (549) color digital orthophoto tiles in GeoTIF format on DVD
2. One orthophoto mosaic in MrSID format on DVD
3. Orthophoto tile index in ArcView shapefile format
4. Updated DTM data in DWG file format (changes only)

1.6 Orthophoto Tile Maintenance

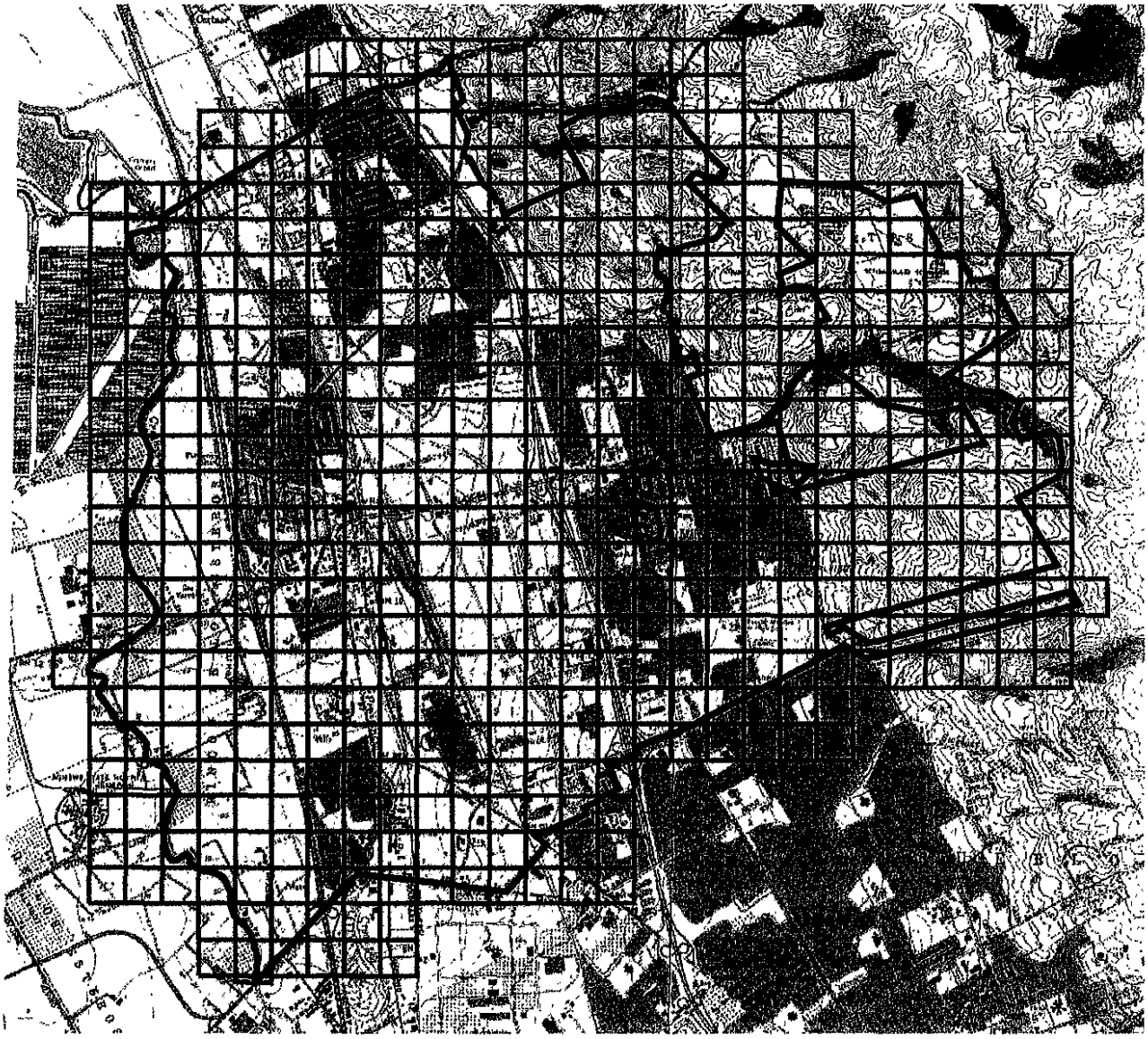
The City of Milpitas provided Towill with shapefiles identifying specific parcels within the city that are scheduled for redevelopment. These areas and the anticipated redevelopment schedule are shown in Exhibit B. This proposal includes flying new color aerial photography and updating specific orthophoto tiles annually for a period of three years. Each of the deliverables listed in Section 1.5 will be provided with each annual map update.

Cost

The cost for this work is presented in the table below. Invoices will be submitted monthly for progress payment based on percentage complete.

Phase	Cost
Spring 2004	$63,200
2004 Update	$4,900
2005 Update	$9,300
2006 Update	$8,500
Total	**$85,900**

EXHIBIT A



1000' x 1000" Orthophoto Tile

City of Milpitas
ORTHOPHOTO UPDATE PROJECT
Spring 2004

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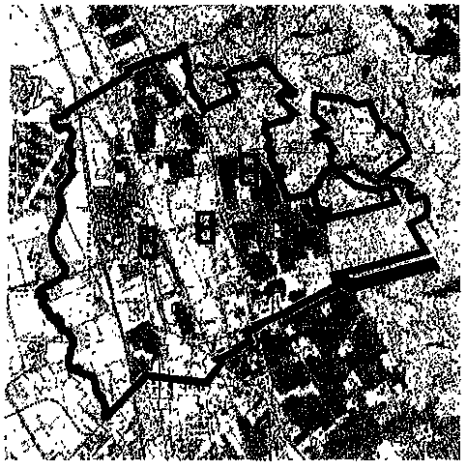
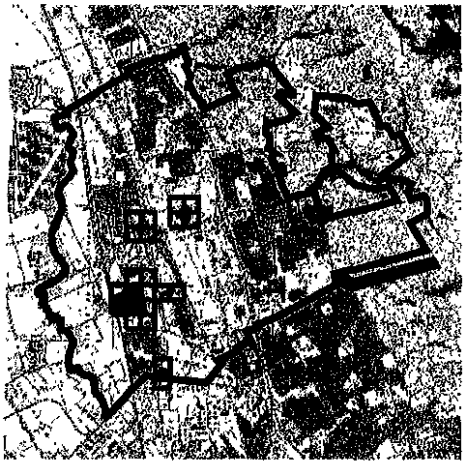
Towill, Inc.
Proposal 10275-901

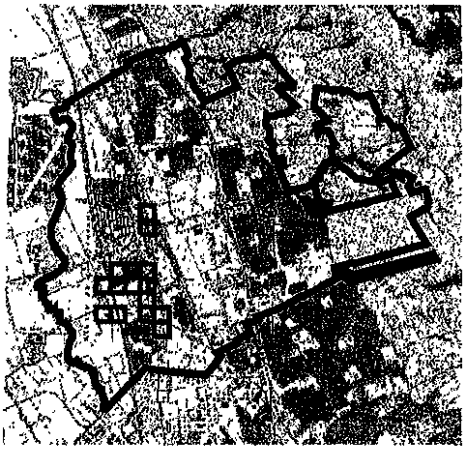
EXHIBIT B



2004 Shapefile



2005 Shapefile



2006 Shapefile

City of Milpitas
ORTHOPHOTO UPDATE PROJECT
2004/2005/2006

1000' x 1000" Orthophoto Tile

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